

PATENTS ACT 1977

BLO/027/90

IN THE MATTER OF an application
by Vereinigte Deutsche Metallwerke AG
for the revocation of Patent No 2080332
in the name of Haynes International Inc

DECISION

Revocation of the patent in suit under Section 72 of the Patents Act 1977 is sought on the grounds of prior publication in US Patent No 3203792, British Patent Specifications 2015573A, 1288215, 1160836, 956166, 745076 and 588002; obviousness having regard to the same publications and also having regard to what was previously known in the United Kingdom; and that the specification of the Patent does not disclose the invention clearly enough and completely enough for it to be performed by a person skilled in the art.

The patent is dated 24 June 1981, claims a priority date of 10 July 1980, and was granted in February 1984 to Cabot Corporation. In June 1987 Haynes International Inc were registered as proprietors.

The patentees' invention is concerned with corrosion-resistant nickel-base alloys, containing principally chromium, molybdenum and tungsten, which resist corrosion when exposed to a variety of severely corrosive media. The specification acknowledges that corrosion-resistant nickel base alloys of this class are known and are generally similar in composition with only a very slight variation in composition between specific alloys. Disclosures of such alloys in several prior US patents are acknowledged but the specification goes on to say that none of these alloys has "the optimum combination of corrosion resistant properties", or "the best resistance

to all environments and media". The patentees' invention is based on the discovery of an alloy which their specification states provides the optimum combination of corrosion resistant properties. The specification gives comparative test results with three prior art alloys, two experimental alloys and the preferred alloy of the invention in corrosive solutions of oxidising acid (the ASTM G-28 test), reducing acid (specifically boiling 100% sulphuric acid), and a cocktail of acids and chlorides referred to as the "green death". The preferred alloy does not perform best in all the tests, but it plainly has the best overall performance in the tests.

The applicants note that Claim 1 as granted is directed to an alloy consisting essentially of, in weight per cent:

- (1) 20-24 chromium
- (2) 12-17 molybdenum
- (3) 2-4 tungsten
- (4) 2-8 iron
- (5) balance nickel plus impurities

A number of other elements may be present either adventitiously or as the result of deliberate additions but contents of these elements over quoted ranges are deleterious and must be avoided. Claim 1 recites these elements and their maximum amounts in weight per cent as follows:

- (6) less than 0.5 columbium (niobium)
- (7) less than 0.5 tantalum
- (8) less than 0.1 carbon
- (9) less than 0.2 silicon
- (10) less than 0.5 manganese
- (11) less than 0.7 aluminium plus titanium
- (12) less than 0.5 vanadium

Claim 1 further recites that

- (13) the ratio of molybdenum to tungsten is within the range 3:1 to 5:1 and
- (14) the ratio of iron to tungsten is within the range 1:1 to 3:1.

This analysis of Claim 1 is accepted by the patentees.

Of the remaining claims, Claim 2 is dependent on Claim 1 and limits the scope of that claim to an alloy which contains 21 to 23 chromium, 12 to 14 molybdenum, 2.5 to 3.5 tungsten, not over .05 carbon, not over 0.1 silicon, 2.5 to 5.5 iron, and not over 0.4 aluminium plus titanium. Claim 3 further restricts the alloy of Claim 1 or Claim 2 to one containing 22 chromium, 13 molybdenum, 3 tungsten, 3 iron. Claim 4 limits any preceding claim to an alloy having an optimum combination of corrosion resistant properties in a variety of corrosive media. Claim 5 limits any preceding claim to an alloy in the form of an article suitable for welding, Claim 6 to an alloy in the form of a coating and Claim 7 to an alloy in the form of a powder. Claim 8 is an omnibus claim to an alloy of Table 2 in the description.

At the hearing before me on February 6-8 1990, Mr A Waugh appeared as Counsel for the patentees and Mr G Burkill as Counsel for the applicants.

Evidence in statutory declaration form is given on behalf of the applicants for revocation by Dr Ulrich Heubner, their Director of Research and Development and Quality Assurance. Evidence for the patentees is given by Dr Paul E Manning, their Marketing Manager, Corrosion Resistant Alloys. The applicants' evidence in reply consists of a second statutory declaration by Dr Heubner, which was objected to as not being confined to matters

strictly in reply.

The patentees submitted additional evidence to deal with the fresh matter, in the form of a second statutory declaration by Dr Manning, a statutory declaration by Joseph Phillips, who is the Manager of their Patents and Trade Marks Department and a statutory declaration by Aziz Asphahani who is their Vice President with responsibility for their corrosion-resistant alloy business and the named inventor in the patent in suit. Although the applicants objected to the admission of some of this evidence inter alia because it must have been available at the evidence in chief, I decided at the hearing to admit all of it, and said that:

"Much of the evidence that the patentees are now seeking to put in could have been put in at the proper time but, having said that, I think I would not be giving full consideration to the issues which are before me if I ignore this evidence.

With hindsight, I think I can see that the right thing to have done would have been to take stock of the evidence that was on file when the three normal rounds of evidence had been completed and to have excised any matter that was not strictly in reply then. But, that opportunity having passed, I think the fairest thing to do now is to admit all the evidence that has been filed."

I considered that it would be artificial in particular at that stage to refuse to consider test results submitted by the patentees and to exclude evidence from the inventor about the making of the invention.

If an application had been made at the conclusion of the normal stages of evidence to excise the relatively limited amount of extra evidence filed by the applicants

in their reply evidence I am sure I would have acceded to that application, with the result that the case could have been heard in October 1989 instead of February 1990. It seemed to me that there would be little advantage in excising the evidence now.

Immediately after my ruling, the applicants submitted a third statutory declaration by Dr Heubner in reply to the patentees' additional evidence and I admitted this, in the absence of any objection by the patentees.

The principal prior art document relied upon by the applicants is Scheil's US Patent No 3203792. This discloses an alloy having high resistance to intergranular corrosion, and consisting of 40-65% nickel, up to 20% cobalt (the total amount of nickel and cobalt being 40-65%), 14-26% (preferably 22-25%) chromium, 3-18% (preferably 14-17%) molybdenum, up to 30% iron, (preferably 0-7%), up to 5% tungsten, up to 0.1% carbon, up to 3% manganese, a combined content of phosphorus and sulphur of up to 0.1% and less than 0.2% silicon. The silicon content is particularly important because Scheil states at col 1, lines 69-72 that:

"...the present invention comprises the discovery that a greatly improved nickel-chromium-molybdenum alloy can be produced if the silicon content of the alloy is maintained at an extremely low level."

The compositional ranges of the components in Claim 1 of the patent in suit and those of Scheil overlap. The alloys of the patentees' Claim 1 have a narrower range of component composition in respect of the major components, namely chromium, molybdenum, tungsten and iron, and none of the alloys exemplified in Scheil falls within the range of the alloys of the patentees Claim 1.

Scheil gives three specific examples of alloys, with the following compositions:

Cr	15.5	22.6	24.1
Mo	17.0	14.0	14.1
Fe	3.8	1.3	1.4
W	3.1	-	-

The first of these, described at col 2, lines 65-70, is what became known commercially as C-276, and has less chromium than the patentees' alloy. The second and third (described respectively at col 3, lines 17-23, and in cols 3 and 4 as Melt V or Melt B) are almost the same, and differ from the patentees' alloy in having too little iron and no tungsten.

Taking the remaining prior patent documents in chronological order, GB 588002 describes a preferred nickel-based alloy with 13-16% chromium, 15-16% molybdenum, 4-6% tungsten, 5-8% iron, 0.1-0.2% carbon. No other specific alloys are disclosed, and the alloy is proposed for use as a durable material for metal-working tools. GB 745076 shows nickel-base alloys for use as electrodes in electrolytic cells. The alloys are resistant to corrosion by solutions of manganese and ammonium mineral salts. Two alloys only are specifically disclosed, one containing 15% Cr, 17% Mo, 5% W, 6% Fe, 55% Ni; and the other 22% Cr, 9% Mo, 2% W, 25% Fe, 39% Ni.

GB 956166 is based on the same German priority document as Scheil and has similar disclosure.

GB 1160836 shows nickel base alloys resistant to corrosion in boiling H₂SO₄/ferric sulphate solution and boiling HCl solution. The alloy comprises 14.5-23 (preferably 14.5-17%) chromium, 14-17% (preferably 15-17%) molybdenum, up to 5% (preferably 3-5%) tungsten, up to 7% (preferably 5-7%) iron, and quantities of cobalt, manganese, vanadium, and up to 0.03% carbon, and up to 0.03% max silicon.

GB 1288215 shows an oxidation-resistant nickel-base alloy for use in gas turbine engines. It is stated that advantageously the alloys are devoid of tungsten (which raises the density) and the molybdenum content then preferably does not exceed 11%. The alloy has 20-30% (preferably 25%) chromium, 3-15% (preferably 10%) molybdenum, yttrium or a rare earth metal, 0.05% carbon, and 0.015% magnesium.

GB 2015573A shows an alloy having improved resistance to hydrogen embrittlement when subjected to an oxygen-free hydrogen sulphide saturated aqueous solution containing NaCl and acetic acid. Molybdenum is said to provide resistance to pitting corrosion and to provide solid - solution strengthening, but in amounts above 20% the alloys have low ductility. Chromium is said to provide corrosion resistance and solid-solution strengthening, but should not exceed 25% because the ductility increases when the alloy is cold-worked. Concentrations of higher than 10% iron reduce corrosion resistance. A preferred alloy contains 14-16% chromium, 15-17% molybdenum, 3-4.5% tungsten, 4-7% iron. Specific alloys having compositions which, apart from chromium, fall substantially within the claims of the specification in suit including the ratios of molybdenum to tungsten and iron to tungsten, have too low a chromium content.

The applicants also rely on a number of published papers available prior to July 1980. "Corrosion of Nickel and Nickel-base alloys" by Wayne Z Friend, chapter 8 pp 292-307 is put forward as a useful digest of commercially-available corrosion-resistant Ni-Cr-Mo alloys. It mentions alloys C-276, C-4 and 625, all acknowledged in the specification in suit. C-276, which is the commercial alloy covered by the Scheil patent, is described as having a nominal composition 15.5% Cr, 16% Mo, 3.75% W, 5.5% Fe. C-4 is a development of C-276 in

which the tungsten content is eliminated to provide thermal stability and INCONEL 625 has a nominal composition 22% Cr, 9% Mo, 3% Fe, 3.56% Cb+Ta.

The most relevant passage of Friend's paper, at page 292, which I accept as setting out the common general knowledge at the priority date, reads as follows:

"It would be expected ... that nickel-base alloys rich in chromium and molybdenum would show useful resistance to corrosion in both oxidizing and reducing environments. To a large extent this is realised in practice with a group of commercial alloys which show unusual resistance to a wide variety of corrosives. Among the various alloys in this group the chromium content ranges from 15-22% and the molybdenum content from 6.5 to 18. Since the molybdenum is often added as ferromolybdenum most of the alloys contain a certain amount of iron. In some cases additional iron is added, replacing part of the nickel, to reduce cost or for other purposes. Some of the alloys contain additional elements such as tungsten, columbium or cobalt, both for improving high temperature strength and for additional corrosion resistance in some media. As would be expected the alloys with higher chromium content usually have best resistance to strongly oxidizing solutions such as nitric acid and to high temperature oxidation. Those alloys with higher molybdenum content usually show best resistance to reducing environments such as straight sulphuric, hydrochloric and phosphoric acids and to pitting attack in chloride environments.

The nickel-base alloys having both high chromium and high molybdenum contents show useful corrosion resistance in the handling of mixed oxidizing and reducing acids such as nitric-sulphuric and

nitric-hydrofluoric acids; in some acid mixtures containing oxidizing salts such as ferric, cupric, and chromic salts, and in resistance to corrosion and pitting attack by oxidizing chloride solutions ...".

"An improved Ni-Cr-Mo Alloy for corrosion Service" by F G Hodge and R Kirchner, Corrosion/74, Paper No 43, National Association of Corrosion Engineers, Houston, Texas 1973 also describes Alloy C-4.

"Effect of Composition and Structure on Crevice, Intergranular and Stress Corrosion of Some Wrought Ni-Cr-Mo alloys" by M A Streicher, CORROSION-NACE, Vol 32, 1976, pp 79-93 shows that the elimination of the tungsten content in alloy C-4 impairs its resistance to crevice corrosion but that this can be restored by the addition of 4% W or by increasing Mo content from 16% to 18%. These changes increase the resistance to general corrosion in reducing acids but decrease the resistance in oxidizing acids.

Stahl-Eisen-Liste published by Verlag Stahleisen m.b.H, in 1975 discloses German Mat.-No 24811 (otherwise known as Remanit HC Neu) containing 19-21% Cr, 14-17% Mo.

I can summarise the closest prior art, in comparison with the principal percentage compositional requirements of claim 1 of the patent in suit, as follows:-

	Claim 1	Scheil's claim 1	Scheil's Melt B	C-276	HC-Neu 2.4811
Cr.	20-24	14-26	24.1	15.5	19-21
Mo.	12-17	3-18	14.1	16	14-17
W	2-4	up to 5	-	3.75	-
Fe	2-8	up to 30	1.4	5.5	-

As regards the allegation of prior publication, the applicants rely in particular (as set out at page 5 paragraph 7 and Table 1 of their statement) on the fact that the compositional ranges of the components in Claim 1 of the specification in suit and those of Scheil overlap. Although no specific example in Scheil falls within the claims of the patent in suit, Mr Burkill submitted that 'since the person skilled in the art is entitled to make alloys at and within the various endpoints of the ranges in Scheil and there are no disincentives in Scheil to deter him from trying those parts of the ranges which overlap, the claimed alloy cannot be novel.

In fact the major area of dispute between counsel at the hearing was whether I should follow a line of case law deciding that the prior publication of an overlapping range destroys novelty, or a line of case law relating to selection patents. The first of these lines of authority is represented by Institut Francais du Petrole [1972] FSR 147; and by EPO decisions in Du Pont T 124/87, Toshiba T 26/85 and Union Carbide T 25/87, and I think it is sufficient to refer to the first two of these.

In Institut Francais du Petrole the Patents Appeal Tribunal upheld the decision of the superintending examiner that a process using a catalyst which was a mixture of 1-60% orthoboric acid with 99-40% metaboric acid was anticipated by the disclosure of the relevant process with a catalyst comprising a mixture of orthoboric acid and metaboric acid in undisclosed proportions. Mr Justice Whitford says (at page 153)

".... the reader of the [prior] specification is quite plainly told that as catalyst he may use a mixture of orthoboric acid and metaboric acid. The terms of the disclosure are broad and he is left free to choose the proportions of these ingredients. It is quite plain that when he makes his choice over

a wide range he would inevitably be infringing the claims....."

In Du Pont, the Board of Appeal held that a copolymer of ethylene and an alpha-olefin having 4 to 10 carbon atoms, the copolymer having a density of about 0.940 to 0.960 g/cm³ and a melt index of 104 to 200 was anticipated by the disclosure in a prior document that ethylene can be polymerised with alpha-olefin having 3 to 12 carbon atoms to obtain polymers having a density of 0.945 to 0.970 g/cm³ and melt indices from about 0.1 to 100 or over.

The Board's finding of fact at para 3.4 was that the prior publication

".... is clearly not limited to the particular polymers whose preparation is described in the examples, but extends to the general class of polymers described [in the prior publication].

This general class of polymers has been made available to the skilled man in a technical teaching, even though only certain polymers within this class are described as having been prepared. Copolymers as defined in the claims of the disputed patent form a major part of this general class of polymers. In the Board's judgement, it follows that copolymers in accordance with the claimed invention form part of the state of the art."

The Board noted however in para 3.5

"... that in the present case both the prior document and the claimed invention are concerned with classes of compounds, and that the finding is therefore in this context. This case is therefore to be distinguished from cases where novelty is in question and where a prior document discloses a

class of compounds and the claimed invention is concerned with the selection of a class of compounds or a particular compound within that class."

Mr Burkill submitted that in the light of these authorities, Scheil's patent anticipated the patent in suit. The ranges of the two principal constituents, chromium and molybdenum, were very similar in Scheil's preferred alloy (that is to say, in Scheil's claim 2) and in claim 1 of the patent (Cr 22-25 in Scheil, 20-24 in the patent; Mo 14-17 in Scheil, 12-17 in the patent).

Mr Burkill said that while Scheil's preferred alloy does not have to contain tungsten and iron, it could do, and the commercial version of Scheil's alloy (C-276) contains W and Fe within the claimed proportions, and with the claimed ratios of Mo:W and Fe:W. The skilled person is therefore being taught by Scheil that a range of alloys is available which substantially overlaps the range of alloys claimed in the patent in suit.

The test for lack of novelty remains, in my view, that a skilled person following the instructions in the prior document would do something that would infringe the claim under consideration. This accords both with the test laid down by the Court of Appeal in General Tyre & Rubber Co v Firestone Tyre & Rubber Co Ltd [1972] RPC 456, and with the case law mentioned earlier on overlapping ranges. For example, in the Toshiba case, the Board of Appeal stated the test to be whether the person skilled in the art would in the light of the technical facts seriously contemplate applying the technical teaching of the prior art document in the range of overlap. If it can be fairly assumed that he would do so it must be concluded that no novelty exists.

In my opinion, the skilled person, following Scheil's instructions at the priority date of the patent in suit, would make either Melt B or C-276. Being unimaginative,

he would have no reason to make a composite alloy containing the chromium content of one of these alloys and the tungsten and iron contents of the other. Accordingly Scheil's patent does not anticipate any of the claims of the patent in suit.

I have carefully considered the remaining prior art documents and am satisfied that none of them contains a prior publication of the invention claimed.

There appear to be three starting points for a consideration of inventive step. These are as follows:

- 1) Alloy C-276;
- 2) Scheil's Melt B; and
- 3) Remanit HC Neu, or No 2.4811.

Alloy C-276 has the nominal composition 16% Cr, 16% Mo, 4% W, 5% Fe, balance nickel and impurities. Thus, as Mr Burkill pointed out, one only has to increase the chromium content by between 4 and 8% to arrive at an alloy within the patentees' claim 1.

Dr Heubner suggests that with the knowledge available to him from the Friend article a person skilled in the art would have looked for alloys with high chromium content of 20 to 22% or more, even up to 24% chromium in view of Scheil, when confronted with the problem of producing an alloy with the requirement of high corrosion resistance to oxidizing media. It is therefore obvious, he said, to increase the chromium level in alloy C-276 to improve corrosion resistance.

I note however that the relevant passage at p292 in Friend only states the general conclusion that amongst the various commercial nickel-chromium-molybdenum alloys which show unusual resistance to a wide variety of corrosives the chromium content ranges from 15 to 22% and the

molybdenum content from 6.5 to 18%. It states that the alloys with higher chromium content usually have best resistance to strongly oxidizing solutions and to high temperature oxidation whilst those alloys with higher molybdenum content show best resistance to reducing environments and to pitting attack in chloride environments. Further I note that of the commercial alloys listed in Table 8.4 of Friend, those containing 22% chromium have 9% or less of molybdenum (ie below the required amount in the patentees' claim) whilst those containing 16% molybdenum have only 16% chromium.

A similar trend is also reflected in the cited patent documents in relation to the tungsten and iron content. Thus in the Scheil patent the preferred alloys contain high chromium and molybdenum, but tungsten is absent and the iron content is less than 2%. In GB 1288215, although a high chromium content is preferred, tungsten is preferably absent and in the preferred alloy the molybdenum content is too low. In GB 1160836, the preferred alloy has low chromium and in the only specific alloy exemplified having high chromium and high molybdenum the tungsten and iron content is too low.

In those other documents disclosing in the same alloy the required content of molybdenum, iron, tungsten (GB 2015573 and GB 588002) the chromium content is too low. On the other hand alloy Remanit HC-Neu, which contains high chromium and molybdenum, has no tungsten and very low iron content. The evidence seems to be, and I take this to be common general knowledge at the priority date, that practical nickel-chromium-molybdenum alloys either combine high chromium with low molybdenum or low chromium with high molybdenum, depending upon the requirements of users under the particular conditions. Further, tungsten is either absent or low in alloys with the required chromium and molybdenum content. On the other hand where the required content of molybdenum and tungsten is present the

chromium content is too low. It is also not just a matter of increasing that chromium content, since percentages above the claimed range are contemplated (in GB 588002 and GB 745076). I therefore do not see that the patentees' alloy is an obvious development from C-276.

Returning to the Scheil patent, the alloy referred to as Melt B has the chromium and molybdenum content of the patentees' claim 1, but tungsten is absent and the iron content is only 1.4%. The Streicher article shows that eliminating the tungsten content in C-276 to give alloy C-4 impairs its resistance to crevice corrosion, but that this resistance could be restored either by adding back the 4% tungsten or by increasing the molybdenum content from 16 to 18%. These changes do not impair its resistance to stress corrosion cracking or increase susceptibility to intergranular attack, and they increase the resistance to general corrosion in reducing acids but decrease the resistance in oxidizing acids.

Dr Heubner suggests in paragraph 7 of his first declaration that a person skilled in the art would have concluded from this that tungsten acts in general in the same way as molybdenum with respect to corrosion resistance but is a little less effective than molybdenum as regards imparting resistance to corrosion in oxidizing media and much less effective than molybdenum as regards crevice corrosion. Dr Heubner further suggests that this is why such alloys as C-4, 625 and Remanit HC Neu have been made containing no tungsten, but that when evaluating the corrosion behaviour of Ni - Cr - Mo alloys the tungsten content must be added to the molybdenum content.

Dr Heubner's evidence seems to me to be in the patentees' favour and suggests that there would be no incentive to modify Scheil's Melt B by including tungsten. I note additionally that GB 1288215 gives good reason why tungsten should be avoided in that it raises the density

of the alloy and the general teaching of the other cited patent documents is for tungsten to be absent or low when the chromium content is high. Consequently, in my view, Scheil would not lead the skilled person to the patentees' alloy.

Remanit HC Neu is slightly further from the claim than is Scheil's preferred example, and can be rejected for the same reason. It is in my view worth mentioning because it was a commercially available alloy. There is however no evidence that anyone appreciated that its corrosion resistance properties could be enhanced by adding 2-4% of tungsten and 2-8% of iron.

Dr Heubner also says in his first declaration at paragraph 8 that the corrosion behaviour of the alloys tested in the specification in suit is exactly what the person skilled in the art would have expected. Thus (following Friend) he says that the decreasing rate of corrosion in an oxidising acid (shown in Table 5 of the specification in suit) with increasing chromium content is predictable and so is the increasing rate of corrosion at the same chromium level as the sum of the molybdenum and tungsten content increases. Further he says that in a reducing acid it would be expected that alloys with increasing content of molybdenum and tungsten would show a decreasing rate of corrosion, which is what Table 6 demonstrates when alloys of the same chromium level are compared.

I am not persuaded that such a simplistic approach can explain why alloy C-20 is the only one of the alloys having good resistance in all the media used in the tests. Mr Waugh drew my attention to Figures 4 and 6 in exhibit PEM4 of Dr Manning's evidence. It seems to me that the nature of these results indicates a more complex interaction of elements and cannot be predicted. The applicants have therefore failed to satisfy me that the

invention claimed is an obvious development of anything that was known at the priority date.

That is not the end of the story however, because the patent differs from the prior art not by the absence or presence of particular constituents, but by having those constituents in particular proportions. It therefore purports to be a selection invention and there is no inventive step in making an arbitrary selection.

In I G Farbenindustrie AG's Patent (1930) 47 RPC 289, at page 332 Mr Justice Maugham laid down three criteria for a selection invention:

1. A selection patent, to be valid must be based on some substantial advantage to be secured (or some substantial disadvantage to be avoided) by the use of the selected members;
2. the whole of the selected members must possess the advantage in question [though a few exceptions are permitted];
3. the selection must be in respect of a quality of a special character which can fairly be said to be peculiar to the selected group.

The learned judge added at page 323, that it was necessary for the patentee to define in clear terms the nature of the characteristic alleged to be possessed by the selection for which he claims a monopoly.

I G Farbenindustrie was still considered authoritative when the House of Lords considered selection inventions in Du Pont's (Witsiepe's) Application [1982] FSR 303, and the case law of the EPO Board of Appeal, to which I was referred, is in my view also consistent with it. It is sufficient to refer to Hoechst (T 198/84, [1985] EPOJ 209), where the patentee had selected a particular range of known catalyst in a known process. The Board upheld

the patent, which they said (at para 7) they would not have done:-

".... if the selected range only had the same properties and capabilities as the whole range, so that what had been selected was only an arbitrary specimen from the prior art. This is not the case, since the effect of the substantial improvement in field may be believed to occur only within the selected range ("purposive selection")."

The specification in suit records tests on a series of alloys for corrosion resistance in a variety of oxidising and reducing corrosive media. The alloys tested are listed in Table 3 and are alloy C-276, alloy C-4, alloy 625, two experimental alloys, and alloy C-20 (the alloy of the invention).

The results of the tests are given in Tables 5-7 and discussed at pages 12, 13. The specification in suit states at page 13 that these results show that alloy C-20 has "the optimum combination" of corrosion resistant properties. While there might be some difficulty as to what is meant by "optimum combination", the patent is clearly offering better all-round resistance to the several corrosive media mentioned in the patent. I have already compared the claimed alloys with the three closest prior art alloys, and I am satisfied that they offer substantial, and indeed unexpected advantages over previously known alloys. The patent therefore meets the first requirement laid down in IG Farbenindustrie.

In relation to requirements (2) and (3) of I G Farbenindustrie the applicants say that there has been no testing of any members of the class defined by the claims other than the single alloy C-20 and it cannot be said that the others in the class would behave in the same way. Further, they say, there is nothing in the

patentees' evidence to substantiate the critical ranges and ratios in Claim 1. They also say that there has been no adequate testing to establish whether the performance of C-20 is unique to alloys within the claim, for example by testing on either side of the borders of the claim to show that those just outside do not have these properties.

Mr Burkill said that the onus was on the patentees to demonstrate that I G Farbenindustrie's second and third requirements are met by the selection, and referred me to the EPO decisions in Ciba-Geigy T181/82 and Kodak T197/86. However these decisions deal with a situation where a patentee is countering an obviousness attack by offering experimental evidence of an unexpected advantage. In contrast the situation here is that I have found that the three closest known alloys do not destroy the validity of the patent, but I am now considering whether, nonetheless, the patent should be regarded as lacking in inventive step because it is for a non-purposive selection. I therefore prefer Mr Waugh's submission that the onus is on the applicants for revocation, based on the decision in Compagnie Centrale des Emeris (1935) 52 RPC 167 where Mr Justice Luxmoore said at page 168 that the opponent to the grant of a patent must show that the conditions required for the grant of a selection patent have not been fulfilled. The case law therefore puts the burden of proof on the applicant to show that the criteria have not been met.

In spite of that, Dr Manning has given evidence of further comparison tests in appendix 1 to his first declaration, using two further experimental alloys and additional test procedures. Additionally, exhibit PEM4 to his second declaration is a report to the patentees' Patents Department dated 28th March 1983 giving test data on a total of 15 alloys, including C-22, C-276 and Remanit HC-Neu. Dr Manning also gives in exhibit PEM5 the composition of 232 heats of alloy C-22, showing the

variation in percentages of constituents under manufacturing conditions. He says, at paragraph 9 of his second declaration, that no deterioration of corrosion resistance has been observed in heats that are within claim 1 but outside the narrower limits of claim 2.

Mr Burkill submitted that more suitable examples could have been chosen for comparison. That may be so, but because the onus is on the applicants the proper way to decide the issue would have been for them to conduct experiments to show that the all-round corrosion resistance of C-20 is not surprising or that some alloys within the scope of claim 1 do not have the all-round corrosion resistance of C-20.

I am therefore satisfied that the criteria of a selection patent have been met. Since Claim 1 is novel and inventive I do not have to consider the remaining claims, which are all dependent upon Claim 1.

The applicants' final ground for revocation as set out in paragraph 12 of their statement is that the specification in suit does not disclose the invention clearly enough and completely enough for it to be performed by a person skilled in the art. As presented by Mr Burkill the allegation is directed to Claim 4, which is a claim to:

"An alloy of any one of the preceding claims having an optimum combination of corrosion resistant properties in a variety of corrosive media".

Mr Burkill's submission was that the specification in suit does not give sufficient instructions to make an alloy with the "optimum combination" of corrosion resistant properties without the exercise of inventive ingenuity. In my view this is not a matter of insufficiency. There is no evidence to suppose that the skilled person would be unable to follow the instructions in the specification and

make any alloy that he chose so that was covered by the claims.

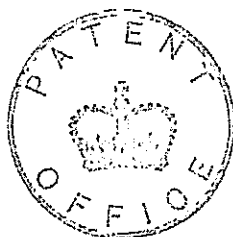
I believe that what Mr Burkill meant was that the boundaries of claim 4 are made imprecise by the functional requirement that the claimed alloy has an optimum combination of properties. Claim 4 was presumably included as an insurance against the possibility that some alloys falling within other claims of the patent in suit could not be said to offer the advantages promised by the patent. Since the main claim, claim 1, is valid, and there is no evidence that any alloys within claim 1 fail to offer the benefits of the invention, I do not think that the precise boundaries of claim 4 are of any practical significance. I do not find that the specification is insufficient. In conclusion I dismiss the application for revocation.

At the end of the hearing, both counsel asked me to reserve the question of costs for further consideration. I therefore allow three months for either party to apply for costs and/or to suggest the procedure for deciding upon an award of costs.

Dated this 29 day of March 1990

W J LYON

Superintending Examiner, acting for the Comptroller



THE PATENT OFFICE

WJLAAO